

Exhibit 21

First Declaration of Thomas Hofeller, Ph.D.

IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF NORTH CAROLINA
NO. 1:15-CV-00399

SANDRA LITTLE COVINGTON, *et al.*,)
)
Plaintiffs,)
)
v.)
)
STATE OF NORTH CAROLINA, *et al.*)
)
Defendants.)
_____)

FIRST DECLARATION OF THOMAS B. HOFELLER, PH.D.

Under penalty of perjury, I Thomas Brooks Hofeller, declare the following:

1. I am a recognized expert in the fields of districting and reapportionment in the United States. I have been retained, as an independent consultant, through counsel by Defendants to provide expert testimony in this case. My hourly rate is \$300 per hour.

QUALIFICATIONS

2. I set forth here a summary of my experience that is most relevant to this testimony. The full range of my professional qualifications and experience is included in my resume, which is attached as Exhibit 1.

3. I am a Partner in Geographic Strategies, LLC, located in Columbia, South Carolina. Geographic Strategies provides redistricting services including database construction, strategic political and legal planning in preparation for actual line drawing, support services and training on the use of geographic information systems (GIS) used in

redistricting, analysis of plan drafts, and actual line-drawing when requested. The corporation and its principals also provide litigation support.

4. I hold a Ph.D. from Claremont Graduate University, where my major fields of study were American political philosophy, urban studies and American politics. I hold a B.A. from Claremont McKenna College with a major in political science.

5. I have been involved in the redistricting process for over 46 years, and have played a major role in the development of computerized redistricting systems, having first supervised the construction of such a system for the California State Assembly in 1970-71.

6. I have been active in the redistricting process leading up to and following each decennial census since 1970. I have been intimately involved with the construction of databases combining demographic data received from the United States Census Bureau with election information which is used to determine the probable success of parties and minorities in proposed and newly enacted districts. Most of my experience has been related to congressional and legislative districts, but I have also had the opportunity to analyze municipal and county-level districts.

7. I served for a year and one half as Staff Director for the U. S. House Subcommittee on the Census in 1998-99.

8. I was Staff Director of the Subcommittee when the Census Bureau was proposing to substitute the American Community Survey (ACS) for the use of the decennial long form questionnaire in the 2000 and previous decennial Censuses. The long form was not used in the 2010 Decennial Census.

9. I have drafted and analyzed plans in most states including, but not limited to, California, Nevada, Arizona, New Mexico, Colorado, Texas, Oklahoma, Kansas, Missouri, Minnesota, Wisconsin, Illinois, Indiana, Ohio, Arkansas, Mississippi, Louisiana, Alabama, Georgia, Florida, South Carolina, North Carolina, Virginia, New York, New Jersey and Massachusetts.

10. In this decennial round of redistricting, I have already been intensely involved in Texas, Alabama, North Carolina, Virginia and Massachusetts. As much of my consulting activities involve work in states subject to the provisions of Section 5 of the Voting Rights Act, I am very familiar with the data used to analyze the expected performance of redrawn and newly created minority districts. I regularly advise clients about the characteristics of minority districts in their plans, and whether or not they are meeting the requirements of both Sections 2 and 5 of the Voting Rights Act.

11. I have given testimony as an expert witness in a number of important redistricting cases including, but not limited to, Gingles v. Edmisten, 590 F. Supp. 345 (N.D.N.C. 1984), *aff'd in part and rev'd in part* Thornburg v. Gingles 478 U.S. 30 (1986); State of Mississippi v. United States, 490 F. Supp. 569 (D.C.D.C. 1979); Shaw v. Hunt, 92-202-CIV-5-BR, U.S. District Court for the Eastern District of North Carolina, Raleigh Division (1993-4); Ketchum v. Byrne, 740 F.2d 1398, *cert. denied* City Council of Chicago v. Ketchum, 471 U.S. 1135 (1985), *on remand*, Ketchum v. City of Chicago 630 F. Supp. 551 (N.D. Ill. 1985); and Arizonans for Fair Representation v. Symington, CIV 92-0256, U.S. District Court Arizona (1992), *aff'd mem. sub nom.* Arizona Community Forum v. Symington, 506 U.S. 969 (1992); David Harris v. Patrick McCrory,

Civil Action No. 1:13 CV-00949 (United States District Court, Middle District of North Carolina Durham Division 2013) and North Carolina State Conference of the NAACP v. Patrick Lloyd McCrory, 1:13 CV-658 (United States District Court, Middle District of North Carolina 2013).

12. I have done considerable work regarding compactness as a criterion in redistricting maps, including but not limited to a work I coauthored in *The Journal of Politics*, "Measuring Compactness and the Role of a Compactness Standard in a Test for Partisan and Racial Gerrymandering." *Id.*, Vol. 52, No. 4 (Nov., 1990), pp. 1155-1181 (with Richard G. Niemi, Bernard Grofman, and Carl Carlucci).

13. In that work, my co-authors and I discussed the advantages and limitations of various measures of compactness as well as differing definitions. As we stated in the article, "disputes about compactness will be numerous... there are those who would dismiss it outright as well as those who believe in it passionately." We further noted that "whatever turns out to be its utility as a districting standard, we hope that we have sufficiently clarified the concept so as to stimulate more rational, enlightened discussion of its merits and faults as well as further study of its supposed effects."

14. Both prior and subsequent to my co-authorship of the *Journal of Politics* article, I have regularly advised state legislatures and others regarding the concept of compactness and regarding the compactness of specific districts and districting plans.

DATA AND SOFTWARE

15. Census Data used in this report comes from the United States Bureau of the Census' 2010 Redistricting Data File and the 2010 Decennial Census TIGER File, both

released following the 2010 Decennial Census. No data containing election results or voter registration was used to prepare this report.

16. All the information I used has been incorporated into a geographic information system called "Maptitude for Redistricting", a product which is offered by Caliper Corporation, based in Newton, Massachusetts. The maps included in this report have all been produced using Maptitude, and tables were produced using census and election data extracted from Maptitude and reformatted using Microsoft Excel. Other reports, such as compactness reports and core constituency reports were also produced using Maptitude.

OBJECTIVES OF DECLARATION

17. I have been asked by Defendants to analyze the current legislative districts for North Carolina, known as the "Rucho Senate 2" Plan, enacted as Session Law 2011-402 on July 27th, 2011 (2011 Enacted Senate Plan), and the "Lewis-Dollar-Dockham 4" Plan (Lewis-Dollar-Dockham 3, as amended), enacted as Session Law 2011-404 on July 28th, 2011 (2011 Enacted House Plan) comparing them with a State House Exemplar Plan and a State Senate Exemplar Plan which I prepared to demonstrate the number of compact minority districts which could be drawn in North Carolina if the drafting process was not subject to the county grouping criteria mandated by the North Carolina Supreme Court's *Stephenson* decisions handed down prior to this redistricting cycle. *Dickson v. Rucho*, 11 CVS 1689 and 1640, Third Affidavit of Thomas B. Hofeller, Ph.D., ¶¶ 23-68, Exs. 1-11 (Wake County Superior Court, 12-10-12).

EXEMPLAR PLANS

18. I found that, for the State House, 25 exemplar districts with an any part Black voting age population APBLKVAP percentage in excess of 50% could be constructed (House Exemplar Districts 5, 7, 12, 18, 21, 23, 24, 27, 29, 31, 32, 33, 38, 42, 43, 48, 57, 58, 60, 71, 99, 101, 102, 106 and 107). In addition I constructed one exemplar district with a mixed minority voting age population (VAP), comprised of Blacks and Hispanics, in excess of 50% minority population (House Exemplar District 72). I also constructed an exemplar district with an American-Indian VAP percentage above 50% (House Exemplar District 47). *Id.*

19. I found that, for the State Senate, 10 exemplar districts with an APBLKVAP percentage in excess of 50% could be constructed (Senate Exemplar Districts 3, 4, 5, 14, 20, 21, 28, 32, 38 and 40). In addition I constructed one exemplar district with a mixed minority voting age population (VAP), comprised of Blacks and American Indians, in excess of 50% minority population (Senate Exemplar District 13). *Id.*

20. Because of the mandate of the North Carolina Supreme Court in the *Stephenson* decision to harmonize North Carolina's county grouping criterion and the requirements of Sections 2 and 5 of the Voting Rights Act, it was necessary to consider minority exemplar districts to determine all the locations in the State where majority minority districts could be drawn based upon reasonably compact minority populations.

21. A further discussion of the use of exemplar districts and pre-drafting voting rights analyses may be found in my Third Affidavit prepared in *Dickson v. Rucho*. My

Third Affidavit also contains basic demographic information of the 2011 Enacted and Exemplar Districts as well as maps of all the exemplar districts.

22. For simplification of comparison of the enacted and exemplar districts for each chamber, the exemplar districts are numbered to correspond with the equivalent numbers of the enacted districts with the most overlapping population.

23. There is not an exact one-to-one correspondence between the exemplar and enacted district because of the requirement to follow the North Carolina Supreme Court's mandate to construct legislative districts within groups of whole counties, which is neutral in that it is formula driven. This requirement also addresses the neutral criterion of communities of interest. The *Stephenson* criteria are discussed in detail in my Third Affidavit in the *Dickson* case. Because of the requirement to draft one or more districts within a specific county group, and because the population of all the State districts are required to stay within a population deviation range of plus or minus 5% from the ideal district population¹, the enacted districts often could not be drawn with the same population deviations as the exemplar districts.

COMPACTNESS OF EXEMPLAR DISTRICTS

24. I have run compactness reports for both the House and Senate Exemplar Plans which are attached hereto. (See Exhibit 2).

25. Many courts reference the Reock compactness test. This test divides the area of each district by the area of the smallest circle which may be drawn around that

¹ The ideal district population is calculated by dividing the state's total population by the number of district in the legislative body for which a plan is being created.

district. Reock scores can range from .01 to 1.00. For reference, a square district would have a Reock score of .673. The higher the score, the better a district's geographic shape satisfies the requirements of this particular test.

26. The lowest scoring House Exemplar Plan district was District 5 with a Reock score of .18. The lowest scoring Senate Exemplar Plan district was District 32 with a Reock Score of .20. (*See Exhibit 2*).

27. When I found that, except for Exemplar House District 5, all the districts have a Reock compactness score of .20 higher, I created a second exemplar plan for the House. In Exemplar House Plan II (*See Exhibit 3*), only Exemplar District 5 was modified and now has a Reock compactness score of .20. (*See Exhibit 4*)

28. There were six other alternative Plans presented to the General Assembly before the enactment of the 2011 House and Senate Plans. The three alternative plans for the House contained minority districts with Reock scores of less than .20, with the lowest being the House District 12 in the Legislative Black Caucus Plan with a Reock Score of .10. In the SCSJ Plan, HD 27 has a Reock score of 0.16 while HD 12 has a Reock score of 0.17. Under the Democratic Leadership Plan, HD 12 has a Reock score of 0.14.

COMPARISON BETWEEN MINORITY POPULATIONS IN EXEMPLAR AND 2011 ENACTED DISTRICTS

29. Table 1 (*Exhibit 5*) shows the portion of APBLKVAP in enacted House and Senate Districts that can also be found in any exemplar districts. This analysis shows that on average, 91.42% of the APBLKVAP found in the enacted House Districts can also be

found in the exemplar House Districts. On average, for the enacted Senate Districts, 86.05% of the APBLKVAP can also be found in the exemplar Senate Districts.

30. Table 1 also examines this issue by examining the APBLKVAP in exemplar districts that were included in an enacted VRA district. This analysis shows that on average, 90.25% of the APBLKVAP in the exemplar House districts was included in an enacted House District. For the Senate, on average, 83.46% of the APBLKVAP for each exemplar Senate District was included in an enacted Senate District.

GENERAL CONCLUSIONS

31. All of the 2011 enacted VRA districts for the General Assembly are substantially based on the compact minority populations found in the corresponding exemplar districts.

32. All of the exemplar districts are based upon reasonably compact minority populations given the Reock scores for these districts as compared to the Reock scores for all of the alternative VRA districts. Furthermore, according to the North Carolina Supreme Court, none of the alternative maps satisfy the *Stephenson* county grouping criteria which would have an impact on the compactness scores for the alternative VRA districts.

Stated and signed under penalty of perjury on November 6, 2015.


Thomas Brooks Hofeller, Ph.D.

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RESUME

Thomas Brooks Hofeller, Ph.D.

6701 Pointe Vista Circle, Raleigh, North Carolina 27615

Home: (984) 202-5193 – Cell: (703) 623-0764

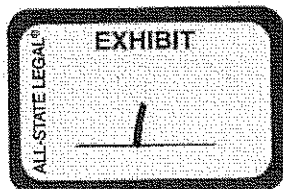
Qualifications:

A varied career in government, business, academia and politics. Positions of significant responsibility, requiring intelligence, scholarship, communications skills, creativity and leadership include:

- ◆ Senior executive management of an office within a large government agency, planning and directing operations of a staff with a diverse number of missions while coordinating activities ranging across an entire agency.
- ◆ Successful completion of a Doctorate in Government requiring research and writing skills and the ability to communicate in an academic setting. Also includes a firm grounding in the philosophical and political roots of the American Governmental System.
- ◆ Litigation support and courtroom experience as a qualified expert witness in federal court. Clear presentation of difficult demographic and statistical concepts – making them understandable to non-technical audiences.
- ◆ Setting up a new U. S. House subcommittee and conducting oversight, developing legislation and interacting with leadership. Experience in statistical, demographic and budgetary analysis.
- ◆ Experience in management and information systems – including database construction, geographic information systems and creation of user interfaces that allow access by persons without extensive computer skills.
- ◆ Creating and managing small businesses, including budgeting, human resources, facilities management, accounting and shareholder interface.
- ◆ Strategic and tactical analysis of political and demographic data for campaigns and political organizations. Understanding of survey design and interpretation, political resource targeting, list development and use of direct mail.

Areas of Expertise:

- ◆ **Operations:** Recruiting, training and directing staffs for existing and newly instituted projects in government and national political organizations. Private sector experience as a business owner and CAO. Proven ability to organize and direct multiple projects with effective use of delegation. Able to function as a team player in both management and support positions.
- ◆ **Communications:** Ability to develop and deliver engaging and informative presentations involving difficult concepts and issues to decision-makers, the public and press. Effective in preparation of affidavits and exhibits as well as giving depositions and delivering courtroom testimony.
- ◆ **Information Technology:** Expertise in analysis of complex technical problems involving large amounts of data – both for analysis and practical use in business, government and politics. Able to break down information and develop effective solutions. Ability to interface between highly technical personnel and management.



- ♦ Considerable experience in integration of mapping and data (geographic information systems).
- ♦ **Budget & Programs:** Experience in budget formulation and managing accurate accounting systems in the private and public sectors.

Education:

- ♦ **Claremont Graduate University**, Claremont, CA – Ph.D. in Government - 1980
- ♦ **Claremont McKenna College**, Claremont CA – B. A. in Political Science - 1970
- ♦ **U. S. Navy, Electronics School**, Treasure Island, CA, Graduate -1966

Publications:

- ♦ Thomas S. Engeman, Edward J. Erler and Thomas B. Hofeller (1980). **The Federalist Concordance**. Chicago: University of Chicago Press.
- ♦ Grofman, Bernard and Hofeller, Thomas B (1990). “**Comparing the Compactness of California Congressional districts Under Three Different Plans**”. In Bernard Grofman (ed) *Political Gerrymandering and the Courts*. New York: Agathon.
- ♦ Richard Niemi, Bernard Grofman, Thomas Hofeller, and Carl Carlucci (1990). **Measuring the Compactness and the Role of a Compactness Standard in a Test for Partisan Gerrymanderings**. *Journal of Politics*.
- ♦ **Reports and affidavits prepared for, and testimony in, numerous court cases** (listed below).

References:

Current and recent employer references are available and will be furnished upon request.

Experience:

Geographic Strategies LLC
7119 Marine Drive
Alexandria, Virginia 22307

Partner

May 2011 – present

- ☐ Geographic Strategies provides redistricting services clients including database construction, strategic political and legal planning in preparation for actual line drawing, support services and training on the use of geographic information systems (GIS) used in redistricting, analysis of plan drafts, and actual line-drawing when requested. The corporation and its principals also provide litigation support.

**State Government Leadership
Foundation**
1800 Diagonal Road, Suite 230

Redistricting Consultant April 2011 – April 2012

Alexandria, VA 22314

Contracting Officer: J. Christopher Jankowski
Executive Director
(571-480-4861)

- ☐ Retained as a consultant to state legislatures and statewide elected officials in all aspects of their work on the 2011-2012 redistricting process.

Areas of consultation:

- ◆ Develop strategic and tactical plans for Legislatures and statewide elected officials to develop and defend redistricting plans for legislative and congressional districts.
- ◆ Providing assistance in actual redistricting plan drafting and analysis.
- ◆ Providing a linkage between complex legal standards and their practical application to plan drafting in difficult political and technical environments.
- ◆ Provide assistance in redistricting litigation
- ◆ Identification of specialized GIS software, database and hardware systems to be used by stakeholders.
- ◆ Ongoing strategic, technical and legal support to those involved in redistricting in all states.
- ◆ Development of a clearinghouse of redistricting activities throughout the nation and analysis of the effects of the process on future elections.

**REPUBLICAN NATIONAL
COMMITTEE**

310 First Street, S.E.

Washington, DC 20003**Redistricting Consultant****May 2009 – April 2011**

Contracting Officer: John Phillippe
RNC Chief Counsel
(202) 863-8638

- ☐ Retained as a consultant to recreate a new department to coordinate the redistricting activities of the National Committee and the greater GOP community in preparation and execution of the 2011 redistricting Areas of responsibility and to support the Committee's 2011 through 2012 redistricting efforts:

- ◆ Developed a strategic plan for the Committee to best position itself for maximum success in this highly competitive process.
- ◆ Liaison and training with members of Congress, legislators, key statewide officials, state parties and other divisions within the Committee to ensure a high level of political, technical and legal preparation.
- ◆ Recruitment and training of a technical and legal staff.
- ◆ Providing a linkage between complex legal standards and their practical application to plan drafting in difficult political and technical environments
- ◆ Identification of specialized GIS software, database and hardware systems to be used by the Committee and other stakeholders.
- ◆ Ongoing strategic, technical and legal support to members of congress and those involved in redistricting in all states, including plan drafting.
- ◆ Development of a clearinghouse of redistricting activities throughout the nation and analysis of the effects of the process on future elections.

**DEPARTMENT OF
AGRICULTURE
FARM SERVICE AGENCY**
1400 Independence Avenue

Washington, DC 20250

**Associate Administrator
for Operations and
Management**

June 2004 – January 2009

Supervisor: Teresa C Lasseter, Administrator
Farm Service Agency
(229) 890-9127

- ☐ Associate Administrator providing management and oversight to staff with diverse missions supporting the activities of the entire Farm Service Agency (FSA).

Areas of responsibility:

- ◆ Provides oversight and guidance to the 1,100 person staff of the Deputy Administrator for Management. These functions include management services, human resources, financial management, budgeting, and information technology.

- ◆ Directs the activities of the Office of Civil Rights which performs all of the EEO functions for the Agency, as well managing FSA's diversity programs.
- ◆ Provides oversight and guidance to the Office of Business and Program Integration. This office supports a wide range of cross-cutting activities including economic policy analysis, strategic planning, outreach, state and county office review, county service center integration, emergency planning, county office reviews and audits, e-Government, and program appeals and litigation.
- ◆ Has primary oversight of the business realignment process underway in the Agency. This realignment includes such projects as Agency-wide enterprise architecture development, field office realignment, and concurrent changes to the Agency's business processes. This realignment is necessary to allow the Agency to meet the present and future challenges involved in providing the best possible customers service and implementation the President's Management Agenda.
- ◆ Spearheads the ongoing reform of the FSA county committee election system which included the drafting of guidelines just published in the Federal Register.

**DEPARTMENT OF
AGRICULTURE
FARM SERVICE AGENCY**
1400 Independence Avenue

Washington, DC 20250

**Director, Office of
Business and Program
Integration**

Apr. 2003 – June 2004

Supervisor: Verle Lanier, Associate Administrator for
Operations and Management (retired)
(301) 424-5776

- Director of a senior level office directing the activities of subordinate staffs with diverse missions supporting the overall activities of the Farm Service Agency.

Areas of responsibility:

- ◆ Provided oversight and guidance to the 75-person staff of the Office of Business and Program Integration. This office supported a wide range of cross-cutting activities including economic policy analysis, strategic planning, outreach, state and county office review, county service center integration, emergency planning, county office reviews and audits, e-Government, and program appeals and litigation.
- ◆ Directed the development of administrative strategies essential to the successful management of e-Government initiatives. Coordinated citizen-centered eGovernment initiatives.
- ◆ Provided centralized direction for the Agency's strategic plan in compliance with the Government Performance and Results Act of 1993.
- ◆ Coordinated outreach efforts for all FSA programs to enhance participation of small or limited resource farmers and ranchers to provide equal access to programs striving to acquire and maintain economic viability for family farmers and ranchers.
- ◆ Directed the preparation of policies and dockets on national program determinations to be submitted for CCC Board consideration and Federal Register publications.

**REPUBLICAN NATIONAL
COMMITTEE**

310 First Street, S.E.

Washington, DC 20003**Redistricting Director****Jul. '99 – Mar. 2003**Supervisor: Thomas Josefiak, former RNC Chief Counsel
(703) 647-2940

- ☐ Hired to create a new department to coordinate the redistricting activities of the National Committee mandated by the release of data from the 2000 Decennial Census.

(See the description of present position.)

**U. S. HOUSE SUBCOMMITTEE
ON THE CENSUS****Staff Director****Feb. '98 – Jul. '99**Supervisor: Hon. Dan Miller, Chairman
(202) 225-5015

- ☐ Staff Director at inception of this oversight subcommittee, created by the House in February of 1998, to monitor the preparations for and the execution of the 2000 Decennial Census. Directed all day-to day operations of the subcommittee including:
 - ◆ Recruitment and training of a staff for a new subcommittee.
 - ◆ Liaison with the Director and Senior Staff of the Census Bureau, the Department of Commerce, and U.S. Senate Staff involved in census oversight.
 - ◆ A complete examination of the preparations underway at the Census Bureau for conduct of the 2000 Decennial Census.
 - ◆ An examination of the proposed statistical methods proposed by the Bureau to improve coverage of the Census.
 - ◆ Reviewed and made recommendations to the Chairman and House Leadership regarding census policy.
 - ◆ Coordination with Government Accounting Office personnel involved in census oversight.
 - ◆ Preparation and support for oversight hearings conducted by the members of the Subcommittee.
 - ◆ Interface between the academic statistical community and the subcommittee in the development of census policy.
 - ◆ Liaison with census stakeholders in general, with particular attention to members of the Decennial Census Advisory Committees.

**U. S. HOUSE COMMITTEE
ON HOUSE OVERSIGHT****Professional Staff****Nov. '97 – Feb. '98**Supervisor: Hon. William M. Thomas, Chairman
(202) 225-2915

- ☐ Involved in the oversight activities of the Committee that supervises the operations of the U.S. House of Representatives. Advised the Chairman and House Leadership on congressional policy with regard to all census operations prior to the establishment of the Subcommittee on the Census.

PARTES CORPORATION**Director of Administration Mar. '96 - Nov. '97**

Kirkland, Washington

Supervisor: Mark Schnitzer, Chairman

- ☐ Chief Administrator of a software development company specializing in the creation of databases used by investment professionals to analyze information on securities.

Information was downloaded, parsed, and reformatted from the Securities and Exchange Commission's EDGAR database and other relevant sources. Was responsible for all administrative functions of the corporation including:

- ◆ Procurement, renovation and management of facilities housing the company.
- ◆ All human resource activities.
- ◆ Accounting and payroll.
- ◆ Liaison with attorneys and shareholders.

CAMPAIGN MAIL & DATA, INC Professional Staff**Nov. '93 - Mar. '96**

Falls Church, Virginia

Supervisor: John Simms, President
(703) 790-8676

- ☐ Supervised development and maintenance of geographic databases that were integrated with the company's various political and commercial lists. Created a new department that collected and converted voter lists from states, counties and towns.

**NATIONAL REPUBLICAN
CONGRESSIONAL COMMITTEE****Redistricting Director****Mar. '89 - Nov. '93**320 First Street, S.E.
Washington, DC 20003

Supervisor: Maria Cino, Chief of Staff

- ☐ Created a new department to coordinate the redistricting activities of the NRCC and provide support to all GOP members of the U.S. House and their staffs.

Areas of responsibility:

- ◆ Recruitment and training of a technical staff.

- ♦ Development of specialized GIS software, databases and hardware systems to be used by the Committee and members of Congress.

**REPUBLICAN NATIONAL
COMMITTEE****MIS Director****Jan. '82 – Mar. 89**

310 First Street, S.E.
Washington, DC 20003

- ☐ Transformed the Committee's computer capabilities from a single mainframe system operated completely within a computer division into a building-wide network, utilized by all divisions and from remote locations. Supervised all the Committee's data processing activities, including database and software development. Directed research activities involving analyses of demographic and election data. Primary computer consultant to the GOP's state and county party organizations.

**ROSE INSTITUTE OF STATE
AND LOCAL GOVERNMENT****Associate Director****1973 – 1981**

Claremont McKenna College
Claremont, California

- ☐ Co-Founder of this Southern California research center specializing in the examination of current financial and political issues affecting California's state and local governments. Supervised staff and day-to-day operations, directed software and database development, managed research projects and assisted in fundraising.

**COMPASS SYSTEMS, INC.
AND LOCAL GOVERNMENT****Vice President****1970 – 1973**

San Diego, California

- ☐ Part of the management team that developed the first computerized geographic mapping and data retrieval system used by the California State Assembly for redistricting and demographic analysis. Directly supervised programming and database development staffs.

UNITED STATES NAVY**Petty Officer 2nd Class****1965 – 1969**

- ☐ Electronics Technician. Served on USS Porterfield, DD682, in Tonkin Gulf operations during Vietnam War. (Honorable Discharge)

Summary of Participation in Lawsuits:

Shaw v. Hunt, 92-202-CIV-5-BR, U.S. District Court for the Eastern District of North Carolina, Raleigh Division (1993-4)

This case was the second trial phase following the U.S. Supreme Court's reversal of the lower court in Shaw v. Reno (1993). Prepared alternative plans for presentation to the court. Prepared political and demographic analyses of the state's plans, along with numerous exhibits supporting the plaintiffs' complaints. Gave a deposition and served as plaintiffs' primary expert witness at trial.

Arizonans for Fair Representation v. Symington, CIV 92-0256, U.S. District Court Arizona (1992), aff'd mem. sub nom. Arizona Community Forum v. Symington, 506 U.S. 969 (1992)

Prepared an affidavit evaluating the three major plans submitted to court for redistricting of Arizona's six congressional districts. Plans were examined with regard to all major redistricting criteria. Also examined minority voting strength in proposed new sixth district in State Senate Plan. Gave expert testimony in trial phase. Drafted a new map for presentation in court that was adopted, with minor changes, by the three-judge panel.

De Grandy v. Wetherell, No 92-40015-WS, U.S. District Court Florida (1992)

Prepared model plans and submitted affidavits evaluating alternative plans for two of the parties in the congressional phase of the case and gave testimony on the political and voting rights implications of various other plans. Presented an affidavit and gave expert testimony in the legislative phase of the case for the De Grandy plaintiffs.

Good v. Van Straten, 800 F. Supp. 557, U.S. District Court Eastern & Western Michigan (1992)

Prepared compactness analysis of plans submitted to court to redistrict Michigan's congressional districts. Gave testimony on compactness theories and other relevant redistricting criteria.

Pope v. Blue, U.S. District Court Western District of North Carolina (1992)

Prepared an affidavit containing compactness analysis and political analysis of the plan passed by North Carolina Legislature and approved by U.S. Department of Justice.

Ketchum v. Byrne, 740 F.2d 1398, cert. denied City Council of Chicago v. Ketchum, 471 U.S. 1135 (1985), on remand, Ketchum v. City of Chicago 630 F. Supp. 551 (N.D. Ill. 1985)

Consultant to African-American plaintiffs (P.A.C.I.). Assisted in building Plaintiffs' political and demographic database, performed a racial and ethnic analysis of City of Chicago, gave a deposition, and testified in court. Participated in second remedy phase of case, gave a second deposition, was prepared to give testimony (the case was settled before retrial).

Carrillo v. City of Los Angeles, No. CV-85-7739 JMI-JRX (unreported) (C.D. Cal. 1986)

Consultant to Mexican American Legal Defense Fund (MALDEF). Constructed database, performed analysis of ethnic voter registration levels, analyzed various plans submitted by all parties, submitted affidavit to the court.

McNeil v. Springfield School District, 656 F. Supp. 1200, 66 F. Supp. 1208 (C.D. Ill 1987), 851 F.2d, 937 (7th Cir. 1988)

Consultant to counsel for Springfield School Board. Constructed demographic database, performed analyses on various proposed districts, gave deposition, presented affidavit to court. Prepared an analysis determining levels of African-American voting strength in proposed districts.

State of Mississippi v. United States, 490 F. Supp. 569 (D.C.D.C. 1979)

Principle consultant to Joint Reapportionment Committee of Mississippi State Legislature. Compiled databases, drew plans, prepared analysis for the legislature, and gave general redistricting advice to Committee Chairman and Counsel. Gave an extensive deposition and testified before the District Court in DC. Assisted in the preparation of all briefs.

Badham v. Eu, 568 F. Supp. 156; 721 F.2d 1170 (1983); -- F.Supp. -- (Apr. 21 1988), appeal docketed, No. 87-1818 56 U.S.L.W. 3791 (U.S. May 4 1988)

Principle technical consultant to counsel for Badham Plaintiffs and Republican National Committee. In charge of all database construction, development of sample court plans, analyses of Burton Plans and preparation of maps, charts and other materials for trial. Submitted affidavits.

Bandemer v. Davis, 478 U.S. 109 (1986)

Consultant to counsel for amicus, Republican National Committee. Prepared a demonstration plan for brief submitted to U.S. Supreme Court.

California Legislature v. Reinecke, 6 Cal. 3d 595 99 Cal. Rptr. 481, 492 P.2d 385 (1972)

As consultant, drafted redistricting plan for California State Senate and Assembly that were subsequently accepted by California Redistricting Commission.

Jordan v. Winter, 541 F. Supp. 1135 (N.D. Miss. 1982)

Performed analyses and gave court testimony on behalf of the defendants.

Gingles v. Edmisten, 590 F. Supp. 345 (N.D.N.C. 1984), aff'd in part and rev'd in part Thornburg v. Gingles 478 U.S. 30 (1986)

Consultant to Attorney General. Performed demographic analysis of state with regard to creation of African-American districts for North Carolina General Assembly. Gave deposition and testimony. Pg. 10 of 14

City of Port Arthur v. United States, 459 U.S. 159 (1982)

Consultant to City Attorney. Performed analysis of racial content of City Council Districts. This was required for the case required because the 1980 Decennial Census data were not yet available. Analysis required extensive residential survey to determine racial characteristics of individual districts. Gave a deposition in the case.

Ryan v. Otto, 661 F.2d 1130 (7th Cir. 1981)

Consultant to Republican plaintiffs and Illinois Congressional Delegation. Drew alternative plans for presentation to Court, gave deposition and testimony.

Rybicki v. State Board of Elections, 584 F. Supp. 849 (N.D. Ill. 1984)

Principle technical consultant to State House of Representatives and the Senate Minority Caucus. Supervised construction of all political and demographic databases. Responsible for design and programming of House's computerized redistricting information system. Analyzed and drafted numerous redistricting plans. Gave depositions and testified at trial.

La Comb v. Growe, 541 F. Supp. 145 (D.Minn.), aff'd sub nom. Orwall v. La Comb, 456 U.S. 966 (1982)

Consultant to Minority members of Congressional Delegation. Drafted a plan for presentation to Court and submitted an affidavit.

Karcher v. Daggett, 462 U.S. 725 (1983), 467 U.S. 1222 (1984)

Participated in presentation of briefs on Republican side. Consultant to members of New Jersey Congressional Delegation.

Flanagan v. Gillmor, 561 F. Supp. 36 (S.D. Ohio 1982) Brown v. Brandon, (unreported), (S.D. Ohio Jan. 30, 1984), as modified (Feb. 13, 1984), aff'd 467 U.S. 1223 (1985)

Consultant to State Legislature. Modified 1981 congressional district redistricting plan to conform to "one person, one vote" standard imposed by decision of the Court.

Massachusetts Republican State Committee v. Connolly, 679 F. Supp. 109 (D. Mass. 1988)

Consultant to counsel for plaintiffs. Examined evidence submitted in regard to 1985 Massachusetts State Census (particularly for Boston), analyzed legislative redistricting plan, submitted affidavit, gave deposition.

Sinkfield v. Bennett, Civil Action CV 93-689-PR (Circuit Court of Montgomery County, Alabama)

Gave testimony supporting the replacement of the Alabama congressional plan drawn by the Federal Court with a plan drawn by the Circuit Court.

Mississippi State Conference of the NAACP v. Haley Barbour, Civil Action No. 3:11-ev-159 TSL-EGJ-LG (SD Mississippi, Jackson Division – 2011)

Prepared a declaration for the intervenors analyzing the compactness and deviations of various legislative plans submitted to the Court for consideration.

Dickson v. Rucho, Civil Action 11 CVS 16896 and North Carolina State Conference of the NAACP v. State of North Carolina, Civil Action 11CVS 16940 (General Court of Justice, Superior Court Division, Raleigh, North Carolina – 2011)

Submitted two affidavits and gave a deposition concerning my role as a consultant to the General Assembly with regard to the redistricting of North Carolina State Senate and State House of Representative districts as well as the redistricting of that state's congressional districts. Testified at hearing before 3-judge panel.

Boone v. Nassau County Legislature, Civil Action CV 11-cv 02712 (Supreme Court of the State of New York, County of Nassau - 2011)

Prepared an affidavit evaluating the 2011 redistricting plan enacted by the Nassau County Legislature and other sample plans presented by the Plaintiffs, with particular attention to the efficacy of the use of the U.S. Census Bureau's American Community Survey for measuring compliance with the provisions of Section 2 of the Federal Voting Rights Act.

Petteway v. Henry, Civil Action CV 11-411 (SD Texas, Galveston Div. 2011)

Prepared and presented at trial an alternative redistricting plan Galveston County's commissioner districts to the court for defendant intervenors.

Pearson v. Koster, Civil Action 11AC-CC00624 (Circuit Court of Cole County, Missouri, Div. II - 2012)

Prepared an affidavit evaluating the compactness of Missouri's newly enacted congressional districts (2011) in light of the State Supreme Court's remand of this case for determination of whether or not, in light of Plaintiffs' alleged claims to the contrary, the districts reflected in H.B. 193 were sufficiently compact to meet the requirement contained in the Missouri Constitution that districts be "composed of territory as compact as may be." Served as the expert witness at trial for the defendant intervenors.

Bob Johnson v. State of Missouri, Civil Action 12AC-00056 (Circuit Court of Cole County, Missouri 2012)

Prepared an affidavit analyzing the compactness and deviations of the enacted State House of Representative districts.

Harris v. Arizona Independent Redistricting Commission, Civil Action cv-12-0894-PHX-ROS (United States District Court, District of Arizona 2012)

Prepared affidavits analyzing the state legislative districts enacted by the Arizona Independent Redistricting Commission concerning population deviations, ethnic and racial characteristics and adherence to other neutral redistricting criteria. Presented expert testimony at trial.

Cynthia Hauser v. Martin O'Malley, Civil Action September Term 2012, Misc. No 5 – 2012, (Maryland Court of Appeals)

Prepared a declaration analyzing the State Senate and State House of Maryland enacted by the Governor following the 2010 Census and comparing both plans to senate and house plans submitted by plaintiffs.. Conclusions were made concerning the integrity of county lines, and district deviations as well as adherence to the provisions of the federal Voting Rights Act.

Kermit L. Moore, Jr. v. State of Tennessee, In the Chancery Court Case No. 120402-III (2012)

Prepared an affidavit analyzing the State Senate redistricting plan enacted by the Legislature for the 2012 elections and compared it to a plan submitted as a bill by the opposition. Conclusions were made analyzing the compliance of both plans with the federal and state provisions of one-person/one vote.

David Harris v. Patrick McCrory, Civil Action No. 1:13 CV-00949 (United States District Court, Middle District of North Carolina Durham Division 2013)

Retained by Defendant's counsel to prepare declarations in response to plaintiffs' expert report concerning the congressional redistricting plan enacted by the North Carolina General Assembly in 2011. Gave a deposition concerning the construction and characteristics of the congressional district contained in the enacted plan as well as other relevant congressional maps. Give expert witness and fact witness testimony at trial.

Terry Petteway v. Galveston County, Texas, Civil No. 3:-cv-00308, (United States District Court, Southern district of Texas, Galveston Division 2013)

Retained by Defendant's counsel to prepare a redistricting map for Galveston County's Justice of the Peace Precincts, prepared a declaration in response to plaintiffs' experts' reports and gave testimony at trial.

North Carolina State Conference of the NAACP v. Patrick Lloyd McCrory, 1:13 CV-658 (United States District Court, Middle District of North Carolina 2013)

Retained by Defendant's counsel to prepare an expert report summarizing a study of information from the voter files of North Carolina's State Board of elections as compared to the North Carolina Department of Motor Vehicles' (DMV) customer file as well as locations of DMV offices proximity to potential registered voters who do not appear to have drivers licenses or DMV ID,s. Performed and analyses of demographics and registration information with regard to this information. Analyzed the locations and hours of one-stop voting centers. Testified as a witness at the trial of the case.

Golden Bethune-Hill v. Virginia State Board of Elections, Civil Action No. 3:14-cv-00852 (United States Court for the Eastern District of Virginia – Richmond Division 2015)

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Retained by Defendant Intervenors to prepare an expert report determining whether H.B. 5005, which the Virginia General Assembly enacted to redistrict the Virginia House of Delegates, was compact and contiguous, and also to comment on other factors which are relevant to such a determination. Offered testimony at the trial in July of 2015.

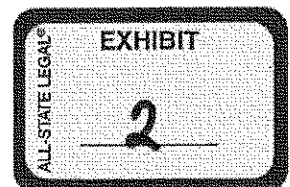
Plan Name: NC House Exemplar Affd
Plan Type: State House
Date: 11/2/2015
Time: 9:15:57PM
Administrator: TBH

Measures of Compactness

11/2/2015

Sum	N/A	N/A
Min	0.18	0.06
Max	0.61	0.47
Mean	0.36	0.22
Std. Dev.	0.12	0.10

DISTRICT	Bench	Polsby-Popper
005	0.18	0.22
007	0.49	0.23
012	0.35	0.14
018	0.43	0.08
021	0.23	0.08
023	0.41	0.30
024	0.29	0.16
027	0.27	0.23
029	0.32	0.25
031	0.37	0.30
032	0.36	0.15
033	0.41	0.18
038	0.26	0.25
042	0.61	0.32
043	0.34	0.21
047	0.56	0.21
048	0.22	0.06
057	0.55	0.34
058	0.26	0.24
060	0.20	0.16
071	0.29	0.22
072	0.27	0.13
099	0.25	0.10
101	0.55	0.47
102	0.46	0.28
106	0.37	0.14
107	0.50	0.39



Plan Name: NC Senate Exemplar Affd
 Plan Type: State House
 Date: 11/2/2015
 Time: 9:14:12PM
 Administrator: TBH

Measures of Compactness

11/2/2015

Sum	N/A	N/A
Min	0.20	0.07
Max	0.51	0.38
Mean	0.36	0.16
Std. Dev.	0.09	0.08

DISTRICT	Reock	Pohby-Popper
03	0.51	0.38
04	0.36	0.18
05	0.42	0.14
13	0.27	0.12
14	0.36	0.22
20	0.48	0.13
21	0.28	0.16
28	0.37	0.18
32	0.20	0.07
38	0.31	0.14
40	0.42	0.10

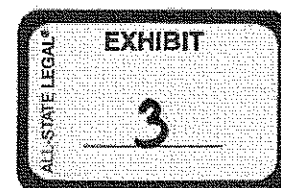
Plan Name: NC House Exemplar Plan II
Plan Type: State House
Date: 11/4/2015
Time: 10:05:11AM
Administrator: TBH

Measures of Compactness

11/4/2015

Sum	N/A	N/A
Min	0.20	0.06
Max	0.61	0.47
Mean	0.36	0.22
Std. Dev.	0.12	0.10

DISTRICT	Reock	Polsby-Popper
005	0.20	0.26
007	0.49	0.23
012	0.35	0.14
018	0.43	0.08
021	0.23	0.08
023	0.41	0.30
024	0.29	0.16
027	0.27	0.23
029	0.32	0.25
031	0.37	0.30
032	0.36	0.15
033	0.41	0.18
038	0.26	0.25
042	0.61	0.32
043	0.34	0.21
047	0.56	0.21
048	0.22	0.06
057	0.55	0.34
058	0.26	0.24
060	0.20	0.16
071	0.29	0.22
072	0.27	0.13
099	0.25	0.10
101	0.55	0.47
102	0.46	0.28
106	0.37	0.14
107	0.50	0.39



MAP 1

House Exemplar Districts with Modified District 5

Area of Northampton County removed from District 5

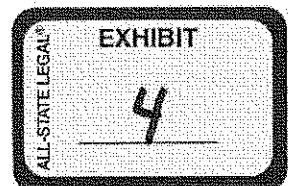
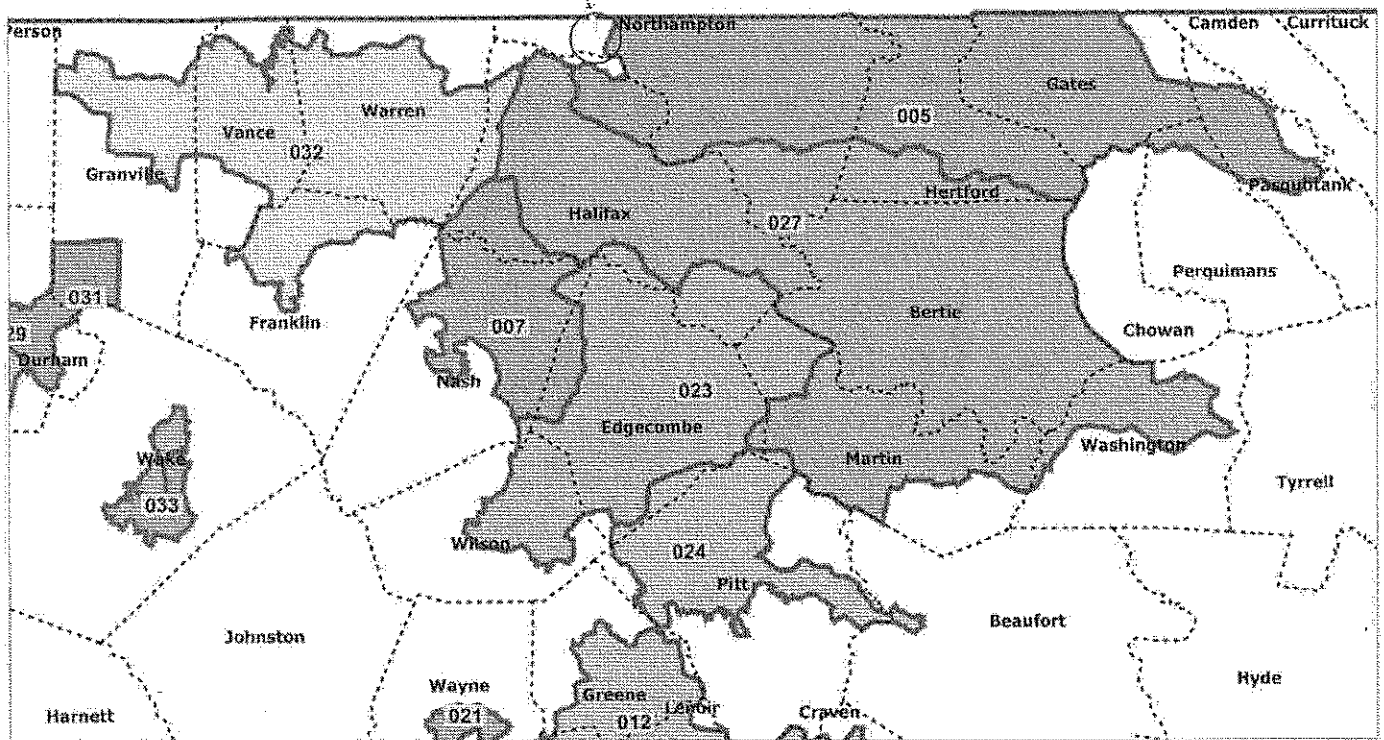


TABLE 1

**Relationship of Portions of Any Part Black Voting Age Population (APBLKVAP)
Contained in 2011 Enacted General Assembly and Exemplar House and Senate Plans
Using 2010 Decennial Census - U. S. Census Bureau Redistricting Data File**

2011 House Enacted and Exemplar Plans			
Enacted District	Portion of Total APBLKVAP in Enacted District from Any Exemplar District	Exemplar District	Portion of Total APBLKVAP in Exemplar District in Any Enacted District
5	96.09	5	99.47
7	78.66	7	96.67
12	87.90	12	82.67
18*	78.07	18*	53.48
21	89.87	21	86.99
23	99.20	23	95.22
24	98.12	24	68.11
27	93.28	27	87.80
29	85.77	29	99.69
31	97.45	31	79.55
32	87.45	32	98.57
33	91.98	33	95.20
38	97.52	38	97.01
42	99.12	42	91.51
43	81.63	43	79.05
47	85.84	47	82.03
48	75.49	48	89.42
57	89.49	57	99.81
58	96.47	58	95.13
60	99.52	60	88.91
71	97.54	71	91.67
72	90.83	72	91.67
99	96.14	99	69.15
101	97.78	101	99.78
102	96.64	102	96.37
106	95.56	106	85.07
107	71.47	107	100.00
Avg.#	91.42	Avg.#	90.25

2011 Senate Enacted and Exemplar Plans			
Enacted District	Portion of Total APBLKVAP in Enacted District from Any Exemplar District	Exemplar District	Portion of Total APBLKVAP in Exemplar District in Any Enacted District
3	95.31	3	83.06
4	93.17	4	89.72
5	81.26	5	93.65
13*	55.09	13*	47.01
14	92.74	14	92.95
20	87.40	20	82.78
21	86.59	21	83.05
28	99.60	28	88.86
32	73.68	32	89.94
38	88.73	38	84.68
40	92.99	40	84.30
Avg.	86.05	Avg.	83.64

Note: Exemplar Senate District 13 was used to create a Black and American-Indian majority mixed-minority district.

Note: Exemplar House District 18 was not used to create a Black majority minority district.

Average does not include House Exemplar District 18

